

CLAIMS

1. A dispensing device of washing agents for a household washing machine, in particular a dishwasher, said dispenser (1) having at least a tank (S) for containing a liquid washing agent and an arrangement (7-21) for dispensing a dose of said liquid washing agent, said arrangement comprising:

- a passage (15A,15,17A,17) apt to put the inside of the said tank (S) in communication with a discharge outlet (21) for said liquid washing agent;
- first plugging means (18) acting on said passage (15A,15,17A,17) and capable of taking a first position, in which the washing agent cannot reach said discharge outlet (21), and a second position, in which the washing agent is able to reach said discharge outlet;
- actuating means (13) producing actuation of said first plugging means (18), characterized in that it provides safety or control means (16), operating along said passage (15A,15,17A,17) and normally operative to prevent washing agent downflow from said tank (S) to said passage (15A,15,17A,17), independently from the position or state of said first plugging means (18).

2. A device according to claim 1, characterized in that said safety means (16) are apt to prevent downflow of liquid washing agent from said tank (S) to said passage (15A,15,17A,17) when said first plugging means (18) permit downflow of the washing agent to said discharge outlet (21), said downflow only being permitted when said first plugging means (18) reach said second position or due to a malfunction of said first plugging means (18).

3. A device according to claim 1 or 2, characterized in that said safety means comprise at least second plugging means (16).

4. A device according to claim 1 or 3, characterized in that said safety means or second plugging means (16) are provided along said passage (15A,15,17A,17) upstream of said first plugging means (18).

5. A device according to claim 1 or 3, characterized in that said passage (15A,15,17A,17) comprises a dosing chamber (15) of said liquid washing agent, in hydraulic communication with said tank (S), said safety means or second plugging means (16) operating between said tank (S) and said dosing chamber (15).

6. A device according to claim 1 or 3, characterized in that said passage (15A,15,17A,17) comprises a dispensing chamber (17) of said liquid washing agent, in hydraulic communication with said dosing chamber (15), said first plugging means (18) operating between said dosing chamber (15) and said dispensing chamber (17), said

dispensing chamber (17) being in hydraulic communication with said discharge outlet (21).

7. A device according to claim 6, characterized in that:

- in said first position, said first plugging means (18) are apt to prevent downflow of liquid washing agent from said dosing chamber (15) to said dispensing chamber (17) and permit downflow of liquid washing agent eventually contained in said dispensing chamber (17) to said discharge outlet (21);
- in said second position, said first plugging means (18) are apt to ensure downflow of liquid washing agent from said dosing chamber (15) to said dispensing chamber (17) and prevent downflow of liquid washing agent eventually contained in said dispensing chamber (17) to said discharge outlet (21);

8. A device according to claims 5 and 6, characterized in that said safety means or second plugging means (16) are capable of taking two different operating conditions, where:

- in the first operating condition, reached when said first plugging means (18) are in said second position, said safety means (16) prevent downflow of liquid washing agent from said tank (S) to said dosing chamber (15);
- in the second operating condition, reached when said first plugging means (18) are in said first position, said safety means (16) permit downflow of liquid washing agent from said dosing chamber (15) to said dispensing chamber (17).

9. A device according to at least one of the previous claims, characterized in that it provides venting means (22,23,24) for putting in communication with the environment outside said tank (S) and/or said dosing chamber (15) and/or said dispensing chamber (17).

10. A device according to at least one of the previous claims, characterized in that said safety means or second plugging means (16) are capable of being completely immersed in the liquid washing agent, contained in particular in said dosing chamber (15), whose relevant actuating means (7) are arranged outside said tank (S) or outside said dosing chamber (15).

11. A device according to at least one of the previous claims, characterized in that said first and/or second plugging means (16,18) comprise an element made from ferromagnetic material (16,18), to which in particular sealing means (16A,18A) are associated.

12. A device according to at least one of the previous claims, characterized in that said actuating means (7;13) comprise a first actuator (7) for operating said safety

means or second plugging means (16), and a second actuator (13) for operating said first plugging means (18).

13. A device according to at least one of the previous claims, characterized in that said actuating means comprise a sole actuator, and that it provides a sole kinematics being apt to produce actuation of said first and second plugging means (16,18) at different times.

14. A device according to at least one of the previous claims, characterized in that said actuating means (7,13) comprise a slow operating actuator, such as in particular a thermo-actuator (7).

15. A device according to at least one of the previous claims, characterized in that said actuating means (7,13) comprise a solenoid (13).

16. A device according to the previous claim, characterized in that said first plugging means (18) represent the rotor or movable core of said solenoid (13).

17. A device according to claim 11, characterized in that it provides a magnetic element (12A) associated to a component (12) of a kinematics (8-12,14) operated by said actuating means (7,13).

18. A device according to claims 13 and 17, characterized in that said magnetic element (12A) is associated to a component of said sole kinematics.

19. A device according to claim 17, characterized in that said component (12) is angularly movable.

20. A device according to the previous claim, characterized in that during the movement of said component (12) the attraction force exerted by said magnetic element (12A) is capable of producing the switching of said safety means or second plugging means (16) from said first to said second operating condition, or vice-versa.

21. A device according to claim 1, characterized in that it provides a second arrangement (40-42) for dispensing at least one dose of a second washing agent, in particular in solid form or powder.

22. A device according to the previous claim, characterized in that said actuating means (7,13) are provided to produce also the actuation of said second arrangement (40-12), through a mechanical kinematics (8-11,14).

23. A device according to the previous claim, characterized in that said mechanical kinematics (8-11,14) comprises a straight toothed element or rack (8), capable of moving by the action of said actuating means (7,13), and at least a gear (14) engaged to said rack (8).

24. A device according to claim 21, characterized in that said second

arrangement (40-12) comprises a recess (40A) containing said second washing agent, a cover (3) for closing said recess (40A) and means (4) for maintaining said cover (3) in its closed position.

25. A device according to claim 21, characterized in that said second arrangement (40-12) comprises a dispenser body (40) delimiting at least a space (40B) for containing a dose of said second washing agent, said dispenser body (40) being rotary around a first axis (42D).

26. A device according to the previous claim, characterized in that said dispenser body (40) is capable of angular movement with respect to a second axis (42C), in particular substantially perpendicular with respect to said first axis.

27. A device according to claim 25, characterized in that it provides a seat (41) housing said dispenser body (40), the latter being capable of taking a first position, in which said dispenser body (40) is inserted in said seat (41), and a second position, in which said dispenser body (40) is inclined to the outside of said seat (41), in order to permit intake of a dose of said second washing agent in said space (40B).

28. A device according to the previous claim, characterized in that an area of said seat (41) is directly facing or open to the inside of the washing tub of the machine whereon the device is assembled.

29. A device according to the previous claim, characterized in that said dispenser body (40) is capable of rotating around said first axis (42D), in order to bring the aperture of said space (40B) substantially in line with said area for permitting discharge of the dose of said second washing agent.

30. A device according to at least one of the previous claims, characterized in that said dispenser body (40) is sustained by a supporting element (42) capable of angular movement.

31. A device according to the previous claim, characterized in that said supporting element (42) has at least a fork portion, said dispenser body (40) being assembled movable and/or inclinable with respect to said supporting element (42).

32. A dispensing device of washing agents for a household washing machine, in particular a dishwasher, said dispenser (1) having at least a tank (S) for containing a liquid washing agent and an arrangement (11-22) for dispensing a dose of said washing agent, said arrangement comprising:

- a dosing space (15), being apt to receive and contain at least a portion of the liquid washing agent contained in said tank (S);
- a passage (17,17A), being apt to permit downflow of liquid washing agent from

said dosing chamber (15) to a discharge or dispensing outlet (21) of said liquid washing agent;

- first plugging means (18) acting on said passage (15A,15,17A,17) and capable of taking a first position, due to which the washing agent cannot reach said discharge outlet (21), and a second position, due to which the washing agent is able to reach said discharge outlet;
- at least an actuator (13), capable of producing actuation of said first plugging means (18),

characterized in that it provides safety or control means (16) switching between two different operating conditions, where:

- in the first operating condition, reached when said first plugging means (18) are in said second position, said safety means (16) prevent downflow of liquid washing agent from said tank (S) to said dosing space (15);
- in the second operating condition, reached when said first plugging means (18) are in said first position, said safety means (16) permit downflow of liquid washing agent from said dosing space (15) to said discharge outlet (21).

33. A device according to claim 32, characterized in that said first safety means (16) are apt to prevent downflow of liquid washing agent from said tank (S) to said dosing space (15) when said first plugging means (18) permit downflow of washing agent to said discharge outlet (21), said downflow being permitted when said second position is reached by said first plugging means (18), or due to a malfunction of said first plugging means (18).

34. A method for dispensing a liquid washing agent in a household washing machine, in particular a dishwasher, by means of a dispenser (1) having at least a tank (S) for containing a liquid washing agent, the method providing:

- admission of at least a portion of the liquid washing agent from said tank (S) to a dosing space (15),
- a subsequent dispensing through a discharge outlet (21) of liquid washing agent contained in said dosing space (15) outside of said dispenser (1),

where first plugging means (18) can be controlled for assuming a first position, due to which the liquid washing agent cannot reach said discharge outlet (21), and a second position, due to which the liquid washing agent can reach said discharge outlet (21),

characterized in that when said first plugging means (18) are in said second position, downflow of liquid washing agent from said tank (S) to said dosing space (15) is prevented, and when said first plugging means (18) are in said first position, downflow

of liquid washing agent from said dosing space (15) is permitted to said discharge outlet (21).

35. A device according to claim 34, characterized in that downflow of liquid washing agent from said tank (S) to said dosing space (15) is prevented when said first plugging means (18) permit downflow of washing agent to said discharge outlet (21), independently whether said downflow is permitted due to said first plugging means (18) having reached said second position or due to a malfunction of said first plugging means (18).

36. A method according to claim 34, characterized in that:

- in said first position, said first plugging means (18) are apt to prevent downflow of liquid washing agent from said dosing space (15) to a said dispensing space (17) and to permit downflow of liquid washing agent eventually contained in said dispensing space (17) to said discharge outlet (21);
- in said second position, said first plugging means (18) are apt to permit downflow of liquid washing agent from said dosing space (15) to said dispensing space (17) and to prevent downflow of liquid washing agent eventually contained in said dispensing space (17) to said discharge outlet (21);

37. A household washing machine comprising a dispensing device of washing agents according to one or more of the claims 1 to 33 and/or using the method for dispensing a liquid washing agent according to one or more of the claims 34 to 36.

38. A washing agents dispenser for a household washing machine, in particular a dishwasher, according to the teachings of the description herein and annexed drawings.

39. A method for dispensing a liquid washing agent in a household washing machine, in particular a dishwasher, according to the teachings of the description herein and annexed drawings.